

Request for Economic Stimulus Funds

Concept Proposal

Submitters (Energy and Sustainability, Doug Whitlock and Jim Tracy):

Eastern Kentucky Environmental Research Institute—

Dr. Alice Jones, Director (alice.jones@eku.edu), and

Dr. Tammy Horn, Senior Researcher/Apiculturist (tammy.horn@eku.edu)

Project Title:

The Kentucky “Bee Power” Project

Project Partners (Known or Anticipated):

- **EKU Partners (known):** Center for Renewable and Alternative Fuel Technology (EKU-CRAFT), Division of Natural Areas, Department of Agriculture, Department of Geography & Geology, Office of Regional Stewardship
- **Regional Commercial Partners (anticipated):** Alltech Biotechnologies, International Coal Group- Hazard, LLC; James River Coal Company, TECO Energy, Pine Branch Coal, Plant-wise Seed Company
- **Other Regional Partners (anticipated):** Appalachian Regional Reforestation Initiative; local economic development agencies. County Extension Offices; local schools

Project Background & Purpose (Justification for Project):

Purpose: The goal of the Kentucky “Bee Power” project is to revitalize Kentucky’s former commercial beekeeping industry and restore ecological health and biodiversity by coordinating industry partners to participate in a process called “**apiforestation**,” i.e., planting diverse and pollinator-friendly tree, shrubs and vegetation and establishing healthy beeyards as supplemental and/or ancillary activities to other working landscapes such as mining, agriculture, biofuels production, and industrial site operations. The goals are as follows:

- (a) incubate regional economic development by training new beekeepers, apicultural industry workers, and existing beekeepers to take advantage of new types of reclamation and agricultural production;
- (b) address the national and immediate need to restore pollinator health by studying how conventional agricultural and industrial uses of the land affect pollinators, and establishing “genetic islands” of honeybees that are physically isolated from the agricultural flyways of the Midwest and California ;
- (c) support this apicultural industry by creating an “apicultural cooperative”—based on other agricultural cooperative models—that provides processing and marketing functions for smaller producers;
- (d) promote long-term ecological restoration and landscape diversification by partnering with coal companies, biofuel and other agricultural producers, and other industrial landholders to establish bee-friendly and ecologically diverse areas that complements other working landscape activities.

Background:

The widespread loss of the nation’s hives, currently referred to as “Colony Collapse Disorder,” is arguably the biggest agricultural disaster since the 1930s Dust Bowl. Pollinator-dependent crops in the major agricultural flyways of the Midwest and California have been particularly hard hit, where 50% of some colony populations have been lost. This national crisis is the backdrop for the Kentucky Bee Power project.

Beekeeping is deeply rooted in Kentucky agricultural history. In the 19th century, Kentucky ranked among the top ten commercial beekeeping states, providing a primary income for many commercial keepers, and a supplemental income for others. But in the 20th century, the fossil fuel industry and industrial agriculture became increasingly important to Kentucky’s economy and also fundamentally changed land use for both people and pollinators. Developing healthy beeyards in cooperation with these economically important working landscape activities could reduce the environmental impacts of these industries while at the same time developing a new and much-needed apicultural industry that is rooted in Kentucky’s rich cultural past.

Beekeeping as economic incubator:

Apiculture has very low initial capital investment cost and relatively fast turnaround time for profitability at even the modest entrepreneurial scale (1 to 2 hives). Once basic skills have been mastered, beekeepers can scale up to the commercial/industrial scale (100 – 1,000 hives) relatively quickly, especially compared to other agricultural industries. Furthermore, beekeeping encompasses vocational and knowledge-based industries: 1. honey production; 2. wax production for creams, lotions, candles; 3. queen production; 4. sciences such as genetics, bee pathology and

botany; 5. extension and education services; and 6. pollination services. Other external industries such as the commercial baking industry and meaderies also provide additional lines of income.

Beekeeping as landscape diversification and environmental restoration:

Active pollinator populations—in a variety of landscape settings—can *improve environmental conditions* by (a) increasing seed-set and decrease mortality among trees and shrubs used to restore mined lands and agricultural/industrial riparian buffer areas; and (b) promote ecological diversity in restoration or conservation areas by increasing the genetic mix of pollens and seeds. This increased vegetative success can lead to better erosion control, and prevent pollution and sedimentation of rivers and lakes. Bees can also *act as “biomarkers”* of air and water health—providing an early detection system against potential threats to the broader environment. Potential applications include:

Coal Mining. The coal industry historically has acted to concentrate rather than diversify both the region’s economy and landscapes. Even the best reclamation projects are typically monocultural (industrial development sites, golf courses, elk habitat), and little attention has been paid to reclaiming with the same diversity that existed prior to mining. However, as of January 2008, we began working with four major coal companies, who have committed to taking reclamation activities in a new direction—to plant diverse habitats that more closely represent the ecosystems that existed prior to mining, and create pollination protection sites on these reclaimed areas until at least 2019.

Traditional Agriculture. The Kentucky Agriculture Water Quality Act requires all landowners with 10 or more acres used for agriculture or silviculture operations to develop and implement a water quality plan based upon guidance from the Kentucky Agriculture Water Quality Plan. Apiculture can help farmers comply with the act by increasing the vegetative success of riparian buffer zones that protect creeks and streams from erosion and nutrient loading from agricultural and silvicultural activities. An added benefit is that a resident healthy pollinator population can increase seed-set of row crops and trees, and also increase yields of hay and pastureland for used for cattle and other animals. We have initiated conversations with Alltech Biotechnologies of Lexington, and explore agricultural linkages with apiforestation.

Biofuel production. A concern with biofuels is that the vast acreage required by some crops, i.e., corn and switchgrass, can inadvertently create vast “pollen deserts” for native and social pollinators. Introducing more diverse plantings in the riparian areas and perimeters of biofuel plantations could ameliorate these impacts. We will collaborate with ECU’s Center for Renewable and Alternative Fuel Technology (ECU-CRAFT) to explore the potential of a partnership between the emerging biofuels industry and an active beekeeping industry.

Manufacturing / Industrial stormwater management. Increasingly stringent stormwater control requirements can affect the siting and location of industrial facilities in small town industrial parks and urban brownfield redevelopment areas. Vegetative areas around natural and engineered draining features such as artificial wetlands and streams could improve stormwater quality while providing pollinator habitat.

Educational Opportunities: In all of these settings, there are opportunities to develop educational programs to introduce the larger public about the importance of pollinator health to food systems and ecological health; and to attract and train new beekeepers—from hobbyists to large-scale producers—into a healthy apicultural economy. Educational programs could include interpretive signage and beeyard tours, small outdoor classrooms for public workshops, formal classes through existing high school, vocational, and college programs; work-to-learn apprentice, journey, and master beekeeper certification programs.

Project Description (General Goals & Implementation Strategies):

Goal 1: incubate regional economic development by training new beekeepers, apicultural industry workers, and existing beekeepers to take advantage of new types of reclamation and agricultural production;

Implementation Strategy: develop and deliver community workshops and advanced training to teach all levels of beekeeping, from basic to advanced skills that employs Integrated Pest Management (IPM), which reduces the need for chemicals in the hive by teaching beekeepers about mite cycles, nonchemical controls such as powdered sugar, and mite counts;

Goal 2: address the national and immediate need to restore pollinator health by studying how conventional mining, agricultural and industrial uses of the land affect pollinators, and establishing “genetic islands” of honeybees that are physically isolated from the agricultural flyways of the Midwest and California;

Implementation Strategy: determine the most compatible working landscapes for pollinator health and a strong beekeeping economy by (a) establishing beeyards in a variety of landscapes; and (b) assessing both land productivity and diversity, and pollinator and beekeeping economy health. *Pollinator health* measures will include

hive external and internal bee hive conditions such as moisture, weight, and weather (drought, rain), presence of mites or disease, pollutant exposure from environmental sources such water or air. The assessment of *beekeeping economy viability* will include hive weights, bee temperaments, medical treatments, brood measurements, honey production and re-queening schedules. *Landscape productivity and diversity* measures will vary by setting, but will include such things as seedset and vegetative success in mine reclamation or stormwater management sites; pollination rates and crop yields in biofuels and agricultural settings; overall biodiversity of flora and fauna; and changing soil conditions from acids to bases in relation to nectar-producing trees and flowers; and changes in off-site erosion and downstream water quality.

Goal 3: support this apicultural industry by creating an “apicultural cooperative”—based on other agricultural cooperative models—that provides processing and marketing functions for smaller producers;

Implementation Strategy: establish a warehouse, processing, distribution, and sales facility (tentatively located in or near Hazard, Kentucky) as a central operation plant for honey and wax-based products

Goal 4: promote long-term ecological restoration and landscape diversification by partnering with coal companies, biofuels and other agricultural producers, and other industrial landholders.

Implementation Strategy: Continue collaborations begin in 2008 with existing coal industry partners to develop and expand beeyards in mine reclamation areas; build on developing relationships with ECU-CRAFT and Alltech Biotechnologies to establish sites in biofuels and other agricultural settings; and seek out willing partners to establish sites in industrial park and/or brownfield settings.

Project Team (Project Manager(s), Content Experts, Instructional Designers, etc.):

Drs. Tammy Horn, Alice Jones, Bruce Pratt

Project Budget & Amount of Economic Stimulus Funds Requested:

Note: The budget was built with the goal that “Bee Power” be income-producing at the end of the two-year project period (requiring approximately 200 working hives); and economically self-sustaining from honey and wax products, pollination services, and training and outreach programs at the end of five years (requiring approximately 1000 hives).

PERSONNEL (34% benefits X 2 years for all personnel)

Director/ Head Beekeeper	75000 base	\$	201,000
Research/ Laboratory Manager	60000 base	\$	160,800
Site Manager/ Field Coordinator	35000 base	\$	93,800
Production Facility Manager	35000 base	\$	93,800
Administrative / Secretarial	25000 base	\$	67,000
Seasonal Beeyard Labor (4)	18000 base	\$	192,960
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			\$ 809,360

FACILITIES AND EQUIPMENT

Warehouse, Processing & Educational Outreach Center	\$	2,000,000
Capital Equipment for warehousing and processing	\$	250,000
Laboratory equipment and supplies	\$	100,000
200 beehives + annual replacement queens and nucs	\$	40,000
Caretaking equipment (smokers, hive tools, etc)	\$	30,000
Equipment Maintenance and Upkeep @ \$7,000/ yr	\$	14,000
Bottling, labelling, marketing and distribution	\$	50,000
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		\$ 2,484,000

EDUCATION, OUTREACH, and JOB TRAINING

Travel @ \$25,000/ yr	\$	25,000
6 Interpretive/ Outdoor Classroom sites @ \$3,000 each	\$	18,000
Materials and supplies @ \$10000/yr	\$	20,000
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		\$ 63,000

OTHER FIXED COSTS

independent inspection, insurance & liability	\$	25,000
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\$ 3,381,360